Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

Squaring (2) and remembering that $a+b+c=1-D$,

$$16m^4+8(4D-3)m^3+(24D^2-32D+5)m^2+(8D^3-14D^2+6D+2)m$$
$$+2D^2-2D^3-2(ab+ac+bc)=\mp 8(2m+8)\sqrt{[(m-a)(m-b)(m-c)]},$$

or $16m^4+Am^3+Bm^2+Cm+E=\mp 8(2m+8)\sqrt{[(m-a)(m-b)(m-c)]}$.....(3).

Squaring (3), $256m^8+32Am^7+(A^2+32B)m^6+(32C+2AB-256)m^5$

$$+[B^2+32C+2AC-2048+256(a+b+c)]m^4+[2AC+2BC$$
$$-4096+2048(a+b+c)-256(ab+ac+bc)]m^3+[C^2+2BE$$
$$+4096(a+b+c)-2048(ab+bc+ac)+256abc]m^2+[2CE$$
$$-4096(ab+ac+bc)+2048abc]m+E^2+4096abc=0.$$

This equation gives m and hence s, which finally gives x, y, z.

Solved in a similar manner by the *PROPOSER*.

177. Proposed by **F. P. MATZ, Sc. D., Ph. D.,** Professor of Mathematics and Astronomy in Defiance College, Defiance, Ohio.

Solve $m^{2x}(m^2+1)=(m^{3x}+m^x)m$.

Solution by **MARCUS BAKER**, U. S. Geological Survey, Washington, D. C.; **CHARLES E. BASSETT**, Central University, Danville, Ky.; and **E. L. SHERWOOD**, Shady Side Academy, Pittsburg, Pa.

The equation may be written $\dfrac{m^{3x}+m^x}{m^{2x}}=\dfrac{m^2+1}{m}$, or $m^x+\dfrac{1}{m^x}=m+\dfrac{1}{m}$,

whence $m^{2x}-\left(m+\dfrac{1}{m}\right)m^x=-1$, from which $m^x=m$ and $1/m$.

Therefore $m^{x\pm1}=1$ and $x\pm1=0$; $x=+1$ and -1.

Also solved by *G. W. GREENWOOD*, and *G. B. M. ZERR*. Professor Zerr finds by performing the indicated operations and factoring, in addition to the roots given above, the root $-\infty$.

GEOMETRY.

197. Proposed by **L. C. WALKER, A. M.,** Graduate Student, Leland Stanford Jr. University, Cal.

Two points P_1, Q_1 are on a generator of a hyperboloid, and P_2, Q_2 the corresponding points on a confocal hyperboloid. Prove $P_1Q_1=P_2Q_2$.

Solution by **G. B. M. ZERR, A. M., Ph. D.,** Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

Let $x^2/a^2-y^2/b^2-z^2/c^2=x^2/\alpha^2-y^2/\beta^2-z^2/\gamma^2=1$ be the hyperboloid and its confocal;

P_1, $Q_1=(d, e, f)$, (h, k, l);
P_2, $Q_2=(m, n, p)$, (r, s, t). We are to prove,

$$(d-h)^2+(e-k)^2+(f-l)^2=(m-r)^2+(n-s)^2+(p-t)^2.$$

For corresponding points,

$$d/a=m/\alpha,\ e/b=n/\beta,\ f/c=p/\gamma,\ h/a=r/\alpha,\ k/b=s/\beta,\ l/c=t/\gamma.$$

$$\therefore\ [(ma/\alpha)-h]^2+[(nb/\beta)-k]^2+[(pc/\gamma)-l]^2$$
$$=[m-(h\alpha/a)]^2+[n-(k\beta/b)]^2+[p-(l\gamma/c)]^2,$$

or $(m/\alpha-h/a)^2(a^2-\alpha^2)+(n/b-k/b)^2(b^2-\beta^2)+(p/\gamma-l/c)^2(c^2-\beta^2)=0.$

This is clearly the case since

$$h^2/a^2-k^2/b^2-l^2/c^2=m^2/\alpha^2-n^2/\beta^2-p^2/\gamma^2=1,$$

or $m^2/\alpha^2-h^2/a^2-(n^2/\beta^2-k^2/b^2)-(p^2/\gamma^2-l^2/c^2)=0.$

$$\therefore\ (m/\alpha-h/a)(m/\alpha+h/a)-(n/\beta-k/b)(n/\beta+k/b)-(p/\gamma-l/c)(p/\gamma+l/c)=0.$$

This is the case when $m/\alpha=h/a$, $n/\beta=k/b$, $p/\gamma=l/c$.

198. Proposed by JOHN J. QUINN, Professor of Mathematics, Warren High School, Warren, Pa.

Trisect an angle (1) by means of the cissoid; (2) by means of the paroboloid.

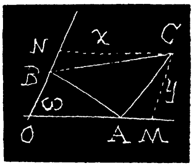
No solution of this problem has been received.

199. Proposed by F. ANDEREGG, A. M., Professor of Mathematics, Oberlin College, Oberlin, Ohio.

Two vertices of a given triangle move along fixed right lines; find the locus of the third vertex. [From Salmon's Conics, Sixth Edition, page 208, Ex. 10.]

Solution by M. W. HASKELL, Professor of Mathematics, The University of California, Berkeley, Cal.

Let us take the fixed lines as the coördinate axes, and denote the angle between them by ω; the interior angles of the triangle by A, B, C, and the lengths of the opposite sides by a, b, c, respectively; and let φ denote the variable angle OAB. From the triangles AMC, BNC, we have immediately from the theorem of sines



$$y/b=\frac{\sin(\pi-A-\varphi)}{\sin(\pi-\omega)}=\frac{\sin(A+\varphi)}{\sin\omega};\quad x/a=\frac{\sin(\omega-B+\varphi)}{\sin\omega}$$

which may immediately be rewritten in the form

$$\sin A\cos\varphi+\cos A\sin\varphi=(y/b)\sin\omega,$$
$$\sin(\omega-B)\cos\varphi+\cos(\omega-B)\sin\varphi=(x/a)\sin\omega.$$

Solving these equations for $\cos\varphi$ and $\sin\varphi$, and observing that $\sin(A+B-\omega)=\sin(C+\omega)$, we have